

## **SPECIFICATION AMENDMENTS:**

Please amend the specification as follows:

On page 1, before the heading "BACKGROUND OF THE INVENTION", please insert the follow section:

### **--CROSS-REFERENCE TO RELATED APPLICATION**

This application is a divisional of copending application serial number 10/200,194, which was filed on July 23, 2002.--

Page 4, line 3, through line 12, please amend the current paragraph as follows:

--As shown in FIG. 2, a high density multi-layer microcoil according to the invention includes a substrate 10, a multi-layer coil winding 60, a magnetic core 70 and an photoresist structure 80. The multi-layer coil winding 60 is composed of a plurality of coil element layers, e.g., C1, C2, C3 and C4, linking one another. Each coil element C1, C2, C3 or C4 is further composed of N windings in a plane. Two ends 61, 62 of the coil layers C1, C4 are contact points for outer circuits. The coil elements C1, C2, C3, C4 are perpendicular to the substrate 10 and linked sequentially to form the continuous coil winding 60. Because the coil winding 60 is perpendicular to the substrate 10, the magnetic ~~field~~ field is parallel to the substrate and will not generate induction current to the substrate as prior arts do.

Page 4, line 21, through Page 5, line 16, please amend the current paragraphs as follows:

Since the high density multi-layer microcoil of the invention is a tridimensional structure, the fabrication process has to be specially designed in order to utilize general planar fabrication process. An applicable method is first to form a dry film of photoresist structure 80 with a coil

tunnel. Then, ~~removing~~ the photoresist is removed from the tunnel by a photo-developing process and ~~forming~~ an empty tunnel is formed. Finally, ~~injecting~~ a conductive material with low melting point injecting into the tunnel and ~~forming~~ the coil winding 60 is formed. The magnetic core 70 is also formed during the process of forming the photoresist structure 80. As shown in FIG. 2, since the magnetic core 70 ~~locates~~ is located in the axis (central line) of the coil winding 60, it can be made when a half of the photoresist structure 80 is finished. While, if the magnetic core 70 is not needed, the process for the magnetic core 70 can be omitted.

Before starting the fabrication process, the number of layers of the coil winding 60 and the number of windings of each coil element have to be planned. As shown in FIGS. 3A and 3B, an example of a multi-layer microcoil is made with 7 coil layers in which each coil element layer is formed with two windings. Some dimensions are also illustrated for reference. The constructional process for the photoresist structure 80 will be more complicated if more windings are needed. The process is first to form the lower half portion of the photoresist structure 80 that includes a lower half tunnel of the multi-layer microcoil 60. Secondly, ~~placing~~ the magnetic core 70 is placed. Thirdly, ~~forming~~ the upper half portion of the photoresist structure 80 that includes an upper half tunnel of the multi-layer microcoil 60 is formed. The links among the coil element layers is made on the upper half portion of the photoresist structure 80, as shown in FIG. 2, or on the lower upper half portion of the photoresist structure 80 if suitable. Through the aforesaid process, a continuous tunnel for the multi-layer microcoil 60 and a magnetic core 70 in the axis of the coil winding are made. When the magnetic core 70 is not needed, a process for the core is then omitted.--

Page 6, line 4, through Page 7, line 3, please amend the current paragraphs as follows:

--The process steps of forming the lower half portion of photoresist structure are illustrated in FIGS. 4A to 4G. In FIG. 4A, a photoresist layer 12 is first deposited on the substrate 10. Then, in FIG. 4B, ~~forming~~ a dry film photoresist 12' is formed by photolithography process. In FIG. 4C, ~~further depositing~~ a photoresist layer 14 is further deposited. And, in FIG. 4D, ~~forming~~ a dry film photoresist 14' is formed by photolithography process. Again, in FIG. 4E, ~~depositing~~ a photoresist layer 16 is deposited, and in FIG. 4F, ~~forming~~ a dry film photoresist 16' is formed. And finally, in FIG. 4G, ~~depositing~~ a photoresist layer 18 is deposited, and ~~forming~~ a dry film photoresist 18' is formed. Thus, the lower half dry film photoresist structure is finished. The tunnel for the coil winding is still filled with original photoresist material.

Now, for the steps of forming magnetic core, an insulation layer 20 is first deposited as shown in FIG. 4H. Then, in FIG. 4I, ~~depositing~~ a photoresist layer 22 is deposited, and ~~forming~~ a dry film photoresist is formed and leaving a space for the magnetic core. Then, in FIG. 4J, ~~etching and removing~~ a portion of the insulation layer 20 is etched and removed, and ~~generating~~ an opening 24 under the space for the magnetic core is generated. In FIG. 4K, ~~depositing~~ a layer 26 of high magnetic permeability material is deposited. Then, in FIG. 4L, ~~removing~~ excessive high magnetic permeability material besides the magnetic core is removed, and finally, in FIG. 4M, ~~removing~~ the insulation layer 20 is removed to and ~~finishing~~ finish the magnetic core 28. The material of the insulation layer 20 is chosen from silicon dioxide ( $\text{SiO}_2$ ) or silicon nitride ( $\text{Si}_3\text{N}_4$ ).

The process steps of forming the upper half portion of photoresist structure are illustrated in FIGS. 4N to 4V. In FIG. 4N, a photoresist layer 30 is first deposited on the substrate 10. Then, in FIG. 4O, ~~forming~~ a dry film photoresist 30' is formed by photolithography process. In FIG. 4P, ~~further depositing~~ a photoresist layer 34 is deposited and ~~forming~~ a dry film photoresist

34' is formed. Again, in FIG. 4Q, ~~depositing~~ a photoresist layer 36 is deposited and ~~forming~~ a dry film photoresist 36' is formed. Further, in FIG. 4R, ~~depositing~~ a photoresist layer 38 is deposited and ~~forming~~ a dry film photoresist 38' is formed. In FIG. 4S, ~~depositing~~ a photoresist layer 40 is deposited and ~~forming~~ a dry film photoresist 40' is formed. And finally, in FIG. 4T, ~~depositing~~ a photoresist layer is deposited and ~~forming~~ a top dry film photoresist is formed. Thus, the whole dry film photoresist structure is finished. The tunnel for the coil winding is filled with original photoresist material.--

Page 7, line 7, through line 12, please amend the current paragraphs as follows:

-- After the forming the whole tunnel windings is finished, the photoresist material ~~in the~~ is removed. As shown in FIG. 4U, the tunnel for the coil winding is cleared. To clear the tunnel, some developing liquid is injected through the openings, i.e., the end points 61, 62 of the coil winding as shown in FIG. 2. The process is slow. After the tunnel is cleared, a conductive alloy with low melting point is injected into the tunnel to form the coil winding, as shown in FIG. 4V.-

Page 7, line 13, through line 26, please amend the current paragraphs as follows:

--A summary of the fabrication process can be made from the aforesaid example of FIGS. 4A to 4V. For a coil element with N windings, the windings are numbered as 1 to N from inner to outer. Each coil winding is composed of a top parallel portion, a bottom parallel portion and two vertical portions and formed as a planar coil element perpendicular

to the substrate. The photoresist structure for supporting the multi-layer coil winding is made by  $4N+1$  times of deposition. The steps are:

- a) In 1 to  $2N$  depositions of photoresist material, using photolithography process to form the lower half portions of the 1 to  $N$  windings of the coil elements. The lower ~~half~~ half portions include the bottom parallel portions and lower halves of vertical portions;
- b) In  $2N+1$  to  $4N$  depositions of photoresist material, using photolithography process to form the upper half portions of the  $N$  to 1 windings of the coil elements. The upper ~~half~~ half portions include upper halves of vertical portions and the top parallel portions; and
- c) In the last  $(4N+1)$  deposition, using photolithography process to form a top of the photoresist structure.--